



ON SOME MOLLUSCA COLLECTIONS FROM DIFFERENT BEACHES OF SOUTH ODISHA COAST OF INDIA

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INTRODUCTION

The study of the molluscs in India although owes its origin to 18th century initiated by the Asiatic Society of Bengal (1784), marine malacology obtained significance only in 20th century with initiatives taken by the Zoological Survey of India (ZSI), Central marine Fisheries of India (CMFRI) and many maritime universities. Several surveys have been conducted to record the marine molluscan fauna of India starting with Preston (1910,1914) to Subba Rao(1968) and Apte (2009). Venkataraman (2012) has reported that 3370 species of molluscs have been recorded from Indian marine habitats where in over 1000 species were from Andaman and Nicobar group of Islands, 428 species from Gulf of Manar and 424 species Lakshadweep. Many of the publications brought out by ZSI on molluscs also mentions about the Odisha coast.

Odisha as maritime state in Indian East coast is bestowed with variety of coastal ecosystems comprising of estuaries, coastal lagoons, creeks, intertidal mudflats, sandy beaches and mangrove swamps sustaining high molluscs diversity. The taxonomic study of molluscs in this state began from Chilka Lake in the early parts of 20th century along with other faunal groups and continued for a long period (Annandale,1915-24; Subba Rao et. al., 1995). The subsequent studies were extended to Mahanadi estuary (Subba Rao, 1968; Subba Rao and Mukherjee,1975; Surya Rao and Maitra, 1998), Rushikulya Estuary (Rama Rao et. al., 1992) and Bahuda Estuary (Pati et. al., 2008). The present

communication deals with the faunal diversity of marine and estuarine molluscs of the south Odisha coast comprising of two estuaries, one pocket lagoon and the coastal track between Patisunapur to Rushikulya Sea turtle rookery.

MATERIALS AND METHODS

Study Area

Beach samples were collected from three locations namely Rushikulya estuary (Lat. 19° 24' N & Long. 85° 05' E), Bahuda estuary (Lat. 19° 04' N Long 84° 35' E) and Gopalpur Creek (Lat. 19° 10' N & Long. 85° 35' E) and their adjoining beaches. These three coastal ecosystems are quite diverse in their physiographic features and hydrographical attributes. The Rushikulya estuary is typical shallow tidal estuary having perinial connection with the Bay of Bengal. It is influenced by semi diurnal tide. Sea water penetration can reach upto a distance of 7 km upstream from its mouth. The estuarine basin is predominantly sandy and major part of the basin remains exposed during lowest low water spring. Bahuda estuary is also shallow. positive estuary influenced by similar semidiurnal tide. But, the sea water penetration can reach upto a distance of 10 km upstream from the mouth. The estuary in its mid ridges, forms an expanded mud flat with clam and oyster beds. The Gopalpur creek is a small and shallow brackish water environment that remains cut of from the sea for most part of the year. The process of water exchange have taken place through seepage based on tidal rhythm. The morphology, physicochemical

characteristics and biological attributes of this creek confirms the requirements of a "pocket lagoon" as defined by Phleger (1981). The substratum of this creek is muddy and major part of its upstream remains exposed during lowest low water spring.

METHODOLOGY

Direct search method was adopted in this study. Monthly survey was conducted for one year from May, 2011 – April, 2012 for sample collections. Collection of samples were made during low tide period. Live specimens and dead shells were collected through hand picking from randomly selected areas of the exposed substratum of the study areas. The number of samples of each species varied from 1-5 depending upon their abundance. Each sample was washed in sea water thoroughly at the collection sites to remove the impurities. After studying the morphological characters, live specimens were fixed with 5% neutralised formaldehyde and brought to the laboratory. They are finally preserved in glycerin ethyl alcohol mixture in the ratio of 1:19 as recommended by Gosner (1971). Washed shells were preserved in polythene bags. Each specimen were photographed before their preservation.

Identification procedure

The identification of specimens were made based on their morphological characters following the taxonomic monographs of Vaught (1989).

RESULTS

Detailed information on the first report till last published records have been cited for each specimen. A brief description of each sample viz. location, collector, year of collection and number of examples is presented.

Class GASTROPODA

Subclass PROSOBRANCHIA

Prosobranch gastropods have either gills situated within the mantle cavity towards the front of the animal, for which they can enable to occupy the different kind of habitats. They have different types of radula, which are so distinct that

have been the basis for classification of the group. Most of the radula consists of transverse rows of teeth, variously arranged. The member of the superfamily Conoidea have harpoon like detachable barbs associated with a poison apparatus. Many species have a chitinous or calcareous plate, the operculum attached to the foot. This structure assumes different forms according to the species and is important aid to identification, Many species enable to seal their aperture with the help of this structure, but in some group e.g cones, it is so reduced in size that it seems to serve no useful function.

Subfamily NERITINAE

Genus *Theodoxus* Montfort, 1810

1852. *Theliostyla* Moersch, *Cat. Conch, Yoldi.*, 1: 167. Type Species: *Nerita albicilla* Linnaeus

Subgenus *Clithon* Montfort, 1810

1852. *Theliostyla* Moersch, *Cat. Conch, Yoldi.*, 1: 167. Type Species: *Nerita albicilla* Linnaeus

1. *Theodoxus (Clithon) oualaniensis* (Lesson)

1830. *Theodoxus oualaniensis* Lesson in Duprey, *Voy. Coq. Zool.*, 2: 379. (Type locality: Oulan, Fiji).

1916. *Theodoxus oualaniensis*: Preston, *Rec. Indian Mus.*, 12(2): 92.

1940. *Smaragdia oualaniensis*: Crichton, *J. Bombay nat. Hist. Soc.*, 42: 340.

1952. *Neritina oualaniensis*: Satyamurti, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist)*, 1(2): 62, pl.4, figs.1 a & 1b.

1986. *Clithon oualaniensis*: Tikader, Daniel and Subba Rao, *Sea shore animals of Andaman and Nicobar Islands*, Zool. Surv. India, p. 167, no. 78.

1991. *Clithon oualaniensis*: Rao, Rao and Maitra, *Fauna of Orissa, State Fauna series*, 1(3): 36, pl. 3, figs. 1, 2. Zool. Surv. India.

1995. *Clithon oualaniensis*: Subba Rao, Surya Rao and Manna, *Fauna of Chilka lake, Wetland Ecosystemseries*, 1: 395. Zool. Surv. India.

2001. *Clithon oualaniensis*: Mahapatra, *Fauna of Godavari Estuary, Estuarine Ecosystem series*, 4: 59. Zool. Surv. India.

2004. *Clithon oualaniensis*: Rao, Maitra, Barua and Ramakrishna, *Fauna of Gujarat, State Fauna series*, 8(2): 284. Zool. Surv. India.

2007. *Theodoxus (Clithon) oualaniensis*: Ramakrishna, Dey, Barua and Mukhopadhyaya, *Fauna of Andhra Pradesh, State Fauna series, 5(7)*: 38. Zool. Surv. India.
2008. *Theodoxus (Clithon) oualaniensis*: Mahapatra, *Fauna of Krishna Estuary, Estuarine Ecosystem series, 5*: 118. Zool. Surv. India.
2008. *Theodoxus (Clithon) oualaniensis*: Roy, Dey, Banerjee and Nandi, *Zoological Research in Human Welfare*, p. 28.
2010. *Theodoxus (Clithon) oualaniensis*: Mahapatra, *Fauna of Vamsadhara and Nagavali Estuary, Estuarine Ecosystem series, 6*: 54. Zool. Surv. India.

Material Examined: 2 exs.

Measurement: Length 7-8 mm

Diagonistic Characters: Shell small, moderately ovate, polished, olive green and marked finely in black and crimson lines in various patterns, irregularly or in spiral bands.

Distribution: India: Andaman and Nicobar Islands, Andhra Pradesh, Gujarat, Karnataka, Kerala, Orissa, Tamil Nadu.

Elsewhere: Sri Lanka, Thailand, Indonesia: Java, Sumatra; Polynesia.

Remarks: Occurs on intertidal grass flats. Common.

Place of collection: Rushikulya estuary

Order MESOGASTROPODA

Family CERITHIIDAE

Subfamily CERITHIINAE

Genus *Cerithium* Bruguiere, 1789

1789. *Cerithium* Bruguiere, *Encyl. Meth. Vers.*, 1(2): 546. Type species: *Cerithium adamsoni* Bruguiere

2. *Cerithium scabridum* (Philippi)

1848. *Cerithium scabridum* Philippi, *Zeits. f. Malak.*, 5: 23.
1898. *Cerithium carnicum*: Melvill and Standen, *Proc. malac. Soc. London*, (Type locality: Madras)
1952. *Cerithium scabridum*: Satyamurti, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist)*, 1(2): 86, pl. 6, fig. 5.
1961. *Cerithium scabridum*: Menon, Datta Gupta and Das Gupta, *J. Bombay nat. Hist. Soc.*, 58(2): 483, pl. 4, fig. 39.
1970. *Cerithium scabridum*: Gopalakrishnan, *J. mar. biol. Ass. India*, 12(1 & 2): 28.

1974. *Cerithium scabridum*: Starmuehlnner, *J. mar. biol. Ass. India*, 16(1): 58.

1982. *Cerithium scabridum*: Rajagopal and Mookherjee, *Rec. zool. Surv. India, Occ. Paper No.*, 28: 37.

2003. *Cerithium scabridum*: Subba Rao, *Rec. zool. Surv. India Occ. Paper No.*, 192: 127, pl. 20, figs. 4, 5.

Materials examine: 2 exs.

Measurement: Length 1.9-2 cm.

Diagonistic Characters: Shell small, slender and oblong, turreted, with 10-14 whorls and distinct sutures. Aperture narrow and obliquely ovate with short and wide anterior canal and shallow posterior canal, flanked by strong columellar plait, outer lip thickened outside and crenulated inside, columella concave with strong callus. Colour white with reddish brown spots on cords and nodules, aperture and columella white.

Distribution: India: Gujarat, Tamil Nadu.

Elsewhere: Red sea, Persian Gulf, Gulf of Aden, Australia.

Remarks: Occurs in sand in subtidal zone.

Place of collection: Rushikulya estuary.

Family BURSIDAE

Genus *Bursa* Roeding, 1798

1798. *Bursa* Roeding, *Mus. Bolten.*, 2: 128.

3. *Bursa rana* (Linnaeus)

1758. *Murex rana* Linnaeus, *Syst. Nat.*, ed. 10: 748. (Type locality: O Asiatico).

1942. *Bursa rana*: Gravely, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist)*, 5(2): 45.

1985. *Bursa (Bufonaria) rana*: Mookherjee, *Rec. zool. Surv. India, Occ. Paper*, 75: 84, pl. 14, figs. 59.

1990. *Bursa rana*: Pinn, *Sea Snails of Pondicherry*, Nehru Science Centre, p. 63, fig. 106.

1991. *Bursa rana*: Rao, Rao and Maitra, *Fauna of Orissa, State Fauna series*, 1(3): 61. Zool. Surv. India.

2000. *Bufonaria rana*: Subba Rao and Dey, *Rec. zool. Surv. India Occ. Paper No.*, 187: 92

2003. *Bursu (Bufonaria) rana*: Subba Rao, *Rec. zool. Surv. India Occ. Paper No.*, 192: 213, pl. 48, figs. 8, 9.

2007. *Bufonaria rana*: Ramakrishna, Dey, Barua and Mukhopadhyaya, *Fauna of Andhra Pradesh, State Fauna series*, 5(7): 81, Pl. 6, figs. 69 & 70. Zool. Surv. India.

2008. *Bursa rana*: Mahapatra, *Fauna of Krishna Estuary, Estuarine Ecosystem series*, 5: 129. Zool. Surv. India.

2010. *Bursa rana*: Mahapatra, *Fauna of Vamsadhara and Nagavali Estuary, Estuarine Ecosystem series*, 6: 58. Zool. Surv. India.

Material Examined: 1exs.

Measurement: Length 7 cm.

Diagonistic Characters: Shell moderately large, oblong-ovate, dorsoventrally depressed; spire conical and elevated, varices prominent and with spines; sculpture with fine granulose spiral threads and spinose nodes; body whorls with 2 rows of nodes and the lower rows smaller, ridges at the lower part finely granular and undulated; outer lip denticulate, columella lacks a calloused parietal shield; aperture oblong, ovate, siphonal canal short or extended; white or creamy stained with reddish brown.

Distribution: India: Andaman and Nicobar Islands, Andhra Pradesh, Orissa, Puducherry, Tamil Nadu, West Bengal; Elsewhere: Indo-Pacific.

Remarks: Offshore, beached. Common.

Place of collection: Rushikulya estuary

Order NEOGASTROPODA
Superfamily MURICOIDEA
Family MURICIDAE
Subfamily MURICINAE
Genus *Murex* Linnaeus, 1758

1758. *Murex* Linnaeus, *Syst. Nat.*, ed. 10: 746. (Type species: *Murex tribulus* Montfort, 1810 (non lightfoot, 1786).

4. *Murex carbonnieri* (Jousseau)

1881. *Acupurpurea carbonnieri* Jousseau, *Le Naturliste*, 44: 345.

1993. *Murex carbonnieri*, Subba Rao and Surya Rao, *Rec. zool. Surv. India. Occ. Paper No.*, 153: 33. pl. 4, figs. 1-3.

Material Examined: 2 exs.

Measurement: Length 8.2-8.4 cm.

Diagonistic Characters: Shell club shaped, spire elevated, consist of 7-9 whorls; whorls subangulate, suture simple, deep, crossed by growth lamellae; aperture acute, ovate, outerlip

margin crenulated, lower part with small labial tooth, inner lip partly adherent on posterior, body whorl large, preceding the whorls along with the body whorl with three prominent varices, provided with long spines, shoulder spine largest, open straight curved terminally, sculpture consists of three prominent spirals cords; siphonal canal and cords, provided with straight spines up to two third of its length, gradually decreases in length.

Distribution: India: Andaman Islands, Andhra Pradesh, Maharashtra, Orissa, Puducherry, Tamil Nadu; Elsewhere: Mauritius, Zanzibar, Sri Lanka, Bangladesh, Philippines.

Remarks: Intertidal, rocks, corals, Indo-pacific

Place of collection: Rushikulya estuary

5. *Bullia vittata* (Linnaeus)

1767. *Bullia vittata* Linnaeus, *Syst. Nat.*, ed.12: 126. (Type locality: ?).

1846. *Bullia livida* Reeve, *Conch. Icon.*, 3, *Bullia* sp. No., 10, pl.2, fig. 10 a-b.

1898. *Bullia vittata*: Melvill and Sykes, *Proc. malac. Soc. London*, 3: 37.

1915. *Bullia vittata*: Preston, *Rec Indian Mus.*, 11: 290.

1940. *Bullia livida*: Crichton, *J. Bombay nat. Hist. Soc.*, 42: 324.

1940. *Bullia vittata*: Crichton, *J. Bombay nat. Hist. Soc.*, 42: 324.

1942. *Bullia livida*: Gravely, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist)*, 5 (2): 59, 99.

1952. *Bullia vittata*: Subramanyam, Karandikar and Murti, *J. Univ. Bombay*, 21 (3): 49, fig. 127.

1968. *Bullia (Dorsanum) vittata*: Ray, *Bull. Indian Mus.*, 3 (1&2): 22, Text fig.15.

1969. *Bullia vittata*: Nagabhushanam, *Proc. zool. Soc. Calcutta*, 22 (1): 6.

1990. *Bullia vittata*: Pinn, *Sea Snails of Pondicherry*, Nehru Science Centre, p. 76, fig. 132.

1991. *Bullia (Leiodomus) livida*: Rao, Rao and Maitra, *Fauna of Orissa, State Fauna series*, 1 (3): 75. Zool. Surv. India.

1991. *Bullia (Dorsanum) vittata*: Rao, Rao and Maitra, *Fauna of Orissa, State Fauna series*, 1(3): 75. Zool. Surv. India.

1995. *Bullia (Dorsanum) vittata*: Subba Rao, Surya Rao and Manna, *Fauna of Chilka lake, Wetland Ecosystemseries*, 1: 406. Zool. Surv. India.
2000. *Bullia vittata*: Subba Rao and Dey, *Rec. zool. Surv. India Occ. Paper No.*, 187: 130.
2003. *Bullia (Dorsanum) vittata*: Subba Rao, *Rec. zool. Surv. India Occ. Paper No.*, 192: 265, Fig. 34, pl. 63, fig.1.
2007. *Bullia vittata*: Ramkrishna, Dey, Barua and Mukhopadhyaya, *Fauna of Andhra Pradesh, State Fauna series*, 5(7): 111. Zool. Surv. India.
2008. *Bullia vittata*: Mahapatra, *Fauna of Krishna Estuary, Estuarine Ecosystem series*, 5: 134. Zool. Surv. India.
2010. *Bullia vittata*: Mahapatra, *Fauna of Vamsadhara and Nagavali Estuary, Estuarine Ecosystem series*, 6: 60. Zool. Surv. India.
- Material Examined*: 5 shells
- Measurement*: Length 1.3-3.6 cm
- Diagonistic Characters*: Shell moderate, elongated, turreted, protoconch consists of three whorls, aperture wide, outer lip smooth, callus smooth, anterior canal short; sculpture with irregular spiral grooves and subsutural ridges, spiral groove more prominent at the base of the body whorl, yellowish to pale brown often with dark brown wavy axial streaks.
- Distribution*: India: Andaman Islands, Andhra Pradesh, Maharashtra, Orissa, Puducherry, Tamil Nadu; Elsewhere: Mauritius, Zanzibar, Sri Lanka, Bangladesh, Philippines.
- Remark*: Estuarine
- Place of Collection*: Rushikulya estuary

Family OLIVIDAE

Subfamily OLIVINAE

Genus *Oliva* Bruguiere, 1789

1789. *Oliva* Bruguiere, *Encyl. Meth. Vers.*, (1): 15.
6. *Oliva oliva* (Linnaeus)
1758. *Voluta oliva* Linnaeus, *Syst. Nat.*, ed.10: 729, sp. No 350. (Type locality: M. Indico).
1898. *Oliva ispidula*: Melvill and Sykes, *Proc. malac. Soc. London*, 3: 39.
1906. *Oliva ispidula*: Comber, *J. Bombay nat Hist. Soc.*, 17: 212.

1940. *Oliva oliva* and *Oliva ispidula*: Crichton, *J. Bombay nat. Hist. Soc.*, 42: 324.
1942. *Oliva oliva*: Gravely, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist)*, 5(2): 63.
1952. *Oliva oliva*: Satyamurti, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist)*, 1(2): 190, pl.18, fig.3.
1952. *Oliva oliva* and *Oliva ispidula*: Subramanyam, Karandikar and Murti, *J. Univ. Bombay*, 21(3): 52, figs. 144 & 146.
1986. *Oliva oliva*: Tikader, Daniel and Subba Rao, *Sea shore animals of Andaman and Nicobar Islands*, Zool. Surv. India, p.171, no 349.
1990. *Oliva Oliva*: Pinn, *Sea Snails of Pondicherry*, Nehru Science Centre, p. 85, fig. 152.
1990. *Oliva ispidula*: Pinn, *Sea Snails of Pondicherry*, Nehru Science Centre, p. 85, fig. 153.
1991. *Oliva oliva*: Rao, Rao and Maitra, *Fauna of Orissa, State Fauna series*, 1(3): 77. Zool. Surv. India.
1995. *Oliva oliva*: Subba Rao, Surya Rao and Manna, *Fauna of Chilka lake, Wetland Ecosystemseries*, 1: 407. Zool. Surv. India.
1998. *Oliva ispidula*: Apte, *Indian Shells, Bombay nat. Hist. Soc.*, p.76, pl. X, fig.6.
2000. *Oliva oliva*: Subba Rao and Dey, *Rec. zool. Surv. India Occ. Paper No.*, 187: 138.
2003. *Oliva oliva*: Subba Rao, *Rec. zool. Surv. India Occ. Paper No.*, 192: 291, pl. 71, fig.2 and Pl. 72, fig. 4.
2004. *Oliva oliva*: Rao, Maitra, Barua and Ramkrishna, *Fauna of Gujarat, State Fauna series*, 8(2): 316. Zool. Surv. India
2007. *Oliva oliva*: Ramkrishna, Dey, Barua and Mukhopadhyaya, *Fauna of Andhra Pradesh, State Fauna series*, 5(7): 116, pl.9, figs. 105 & 106. Zool. Surv. India.

Material Examined: 18 shells*Measurement*: Length 1.4-3 cm

Diagonistic Characters: Shell moderate, polished, spire short, sutural grooves narrow and deep, aperture narrow, columella with a callus on the anterior two- third and oblique, highly variable in colour, white, creamy, brown, yellow or black, ornamented with dark spots and blotches, aperture brown, white or pink.

Distribution: India: Andaman and Nicobar Islands, Andhra Pradesh, Gujarat, Lakshadweep,

Maharashtra, Orissa, Puducherry, Tamil Nadu;

Elsewhere: Tropical Indo-pacific.

Remarks: Common.

Place of collection: Rushikulya estuary

Genus *Olivancillaria* d'Orbigny, 1841

1841. *Olivancillaria* d'Orbigny, *Amer. Marid. (Moll)*, p. 420.

7. *Olivancillaria gibbosa* (Born)

1778. *Voluta gibbosa* Gmelin, *Index Rer. Natr. Cae. Vinod.*, p. 202.

1898. *Oliva (Agaronia) gibbosa*: Melvill and Sykes, *Proc. malac. Soc. London*, 3: 40.

1940. *Oliva gibbosa*: Crichton, *J. Bombay nat. Hist. Soc.*, 42: 324.

1942. *Oliva gibbosa*: Gravely, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist)*, 5(2): 63.

1952. *Oliva gibbosa*: Satyamurti, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist)*, 1(2): 189, pl. 18, figs. 2a & 2b.

1952. *Oliva gibbosa*: Subramanyam, Karandikar and Murti, *J. Univ. Bombay*, 21(3): 52, fig. 145.

1961. *Oliva gibbosa*: Menon, Datta Gupta and Das Gupta, *J. Bombay nat. Hist. Soc.*, 58(2): 489, pl. 9, fig. 70.

1970. *Olivancillaria gibbosa*: Gopalakrishnan, *J. mar. biol. Ass. India*, 12(1&2): 22 & 27.

1977. *Olivancillaria gibbosa*: Ray, *Contribution to the knowledge on the Molluscan fauna of Maungmagan, Lower Burma*, p. 60.

1986. *Olivancillaria (Agaronia) gibbosa*: Tikader, Daniel and Subba Rao, *Sea shore animals of Andaman and Nicobar Islands*, Zool. Surv. India, p. 171, no 352.

1990. *Olivancillaria (Oliva) Gibbosa*: Pinn, *Sea Snails of Pondicherry*, Nehru Science Centre, p. 85, fig. 155.

1991. *Olivancillaria gibbosa*: Rao, Rao and Maitra, *Fauna of Orissa, State Fauna series*, 1(3): 78. Zool. Surv. India.

1992. *Olivancillaria gibbosa*: Subba Rao, Dey and Barua, *Fauna of West Bengal, State Fauna series*, 3(9): 197, pl. 8, fig. 4 & 5. Zool. Surv. India.

1995. *Olivancillaria gibbosa*: Subba Rao, Surya Rao and Manna, *Fauna of Chilka lake, Wetland Ecosystem series*, 1: 407. Zool. Surv. India.

1998. *Oliva gibbosa*: Apte, *Indian Shells, Bombay nat. Hist. Soc.*, p. 76, pl. X, fig. 4.

2000. *Olivancillaria gibbosa*: Subba Rao and Dey, *Rec. zool. Surv. India Occ. Paper No.*, 187: 139.

2003. *Olivancillaria gibbosa*: Subba Rao, *Rec. zool. Surv. India, Occ. Paper No.*, 192: 292, pl. 72, fig. 14.

2007. *Olivancillaria gibbosa*: Ramkrishna, Dey, Barua and Mukhopadhyaya, *Fauna of Andhra Pradesh, State Fauna series*, 5(7): 118, pl. 10, figs. 109 & 110. Zool. Surv. India.

2008. *Olivancillaria gibbosa*: Mahapatra, *Fauna of Krishna Estuary, Estuarine Ecosystem series*, 5: 135. Zool. Surv. India.

2010. *Olivancillaria gibbosa*: Mahapatra, *Fauna of Vamsadhara and Nagavali Estuary, Estuarine Ecosystem series*, 6: 60. Zool. Surv. India.

Material Examined: 2 shells

Measurement: Length 5-5.7 cm

Diagonistic Characters: Shell thick, solid, moderate, elongately ovate, spire acuminate, short, body whorl inflated, suture channelled, aperture wide with slit like posterior canal, columella with thick callus, pale yellowish brown with prominent yellow band at base, mottled or streaked with black spots, sometimes with zigzag transpiral brownish bands, aperture bluish white.

Distribution: India: Andaman and Nicobar Islands, Andhra Pradesh, Gujarat, Maharashtra, Orissa, Puducherry, Tamil Nadu, West Bengal; Elsewhere: Sri Lanka, Bangladesh, Myanmar.

Remarks: Common.

Place of collection: Rushikulya estuary

Superfamily NATICOIDEA
Family NATICIDAE Forbes, 1838
Subfamily POLINICINAE
Genus *Polinices* Montfort, 1810

1810. *Polinices* Montfort, *Conchyl. Syst.*, 2: 222. Subgenus *Glossaulax* Pilsbry, 1929

1929. *Glossaulax* Pilsbry, *Nautilus*, 42: 113.

8. *Polinices (Glossaulax) didyma* (Roeding)

1798. *Albula didyma* Roeding, *Mus. Bolten.*, p. 20.

1906. *Natica (Neverita) didyma*: Comber, *J. Bombay nat. Hist. Soc.*, 17: 208.

1940. *Natica didyma*: Crichton, *J. Bombay nat. Hist. Soc.*, 42: 333, pl. 2, fig. 5.

1942. *Natica didyma*: Gravely, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist)*, 5(2): 37.

1952. *Natica didyma*: Satyamurti, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist)*, 1(2): 110, pl. 8, fig. 5.

1952. *Neverita didyma*: Subramanyam, Karandikar and Murti, *J. Univ. Bombay*, **21** (3):39.
1961. *Natica didyma*: Menon, Datta Gupta and Das Gupta, *J. Bombay nat. Hist. Soc.*, **58** (2): 484, pl.5, figs.43 & 44.
1985. *Polinices (Glossaulax) didyma*: Mookherjee, *Rec. zool. Surv. India, Occ. Paper*, **75**: 54, pl. 9, figs. 37 a & 37 b.
1990. *Natica didyma*: Pinn, *Sea Shells of Pondicherry*, Nehru Science Centre, p. 35, fig. 50.
1991. *Polinices (Glossaulax) didyma*: Rao, Rao and Maitra, *Fauna of Orissa, State Fauna series*, **1** (3): 54. *Zool. Surv. India*.
1992. *Polinices didyma*: Subba Rao, Dey and Barua, *Fauna of West Bengal, State Fauna series*, **3** (9): 183. *Zool. Surv. India*.
2001. *Polinices (Glossaulax) didyma*: Mahapatra, *Fauna of Godavari Estuary, Estuarine Ecosystem series*, **4**: 65. *Zool. Surv. India*.
2003. *Polinices (Glossaulax) didyma*: Subba Rao, *Rec. zool. Surv. India Occ. Paper No.*, **192**: 189.
2004. *Polinices (Glossaulax) didyma*: Rao, Maitra, Barua and Ramakrishna, *Fauna of Gujarat, State Fauna series*, **8** (2): 297. *Zool. Surv. India*.
2007. *Polinices (Glossaulax) didyma*: Ramkrishna, Dey, Barua and Mukhopadhyaya, *Fauna of Andhra Pradesh, State Fauna series*, **5** (7): 64. *Zool. Surv. India*.
2008. *Polinices (Glossaulax) didyma*: Mahapatra, *Fauna of Krishna Estuary, Estuarine Ecosystem series*, **5**: 126. *Zool. Surv. India*.

Material Examined: 1 shell

Measurement: Length 3 cm

Diagonistic Characters: Shell small (up to 3 cm long), ovate-conic in shape, with globose body whorl, short conical spire, convex whorls and moderately impressed suture. Outer surface smoothish. Umbilicus deep and narrowly open, U-shaped, partly occluded centrally by a broad and rounded internal rib forming a callus at columellar margin. Calloused margin of posterior part of inner lip poorly developed, not confluent with the central callus of umbilicus. Operculum calcareous, with a single spiral groove along its outer margin. Outside of shell creamy white, with a dense pattern of wavy,

axial orange-brown lines, becoming thicker, less numerous and strongly pointing forward within 3 spiral bands, those below the suture and near periphery being strongest. Base and umbilical area white, with a single spiral row of short or orange brown streaks.

Distribution: India: Andhra Pradesh, Orissa, Puducherry, Tamil Nadu, West Bengal;

Elsewhere: Indo-Pacific.

Remarks: Indo-pacific

Place of collection: Bahuda estuary

Family FICIDAE

Genus *Ficus* Roeding, 1798

1798. *Ficus* Roeding, *Mus. Bolten.*, p. 148.

9. *Ficus gracilis* (Sowerby)

1825. *Pyrula gracilis* Sowerby, *Cat. Tank.*, pl. 17.

1990. *Ficus gracilis*: Pinn, *Sea Shells of Pondicherry*, Nehru Science Centre, p. 53, fig. 87.

1991. *Ficus gracilis*: Rao, Rao and Maitra, *Fauna of Orissa, State Fauna series*, **1** (3): 58. *Zool. Surv. India*.

1992. *Ficus gracilis*: Subba Rao, Dey and Barua, *Fauna of West Bengal, State Fauna series*, **3** (9): 187, pl.7, fig. 1. *Zool. Surv. India*.

2000. *Ficus gracilis*: Subba Rao and Dey, *Rec. zool. Surv. India Occ. Paper No.*, **187**: 84.

2003. *Ficus gracilis*: Subba Rao, *Rec. zool. Surv. India Occ. Paper No.*, **192**: 199, pl. 42, figs.1-4.

2007. *Ficus gracilis*: Ramkrishna, Dey, Barua and Mukhopadhyaya, *Fauna of Andhra Pradesh, State Fauna series*, **5** (7): 72, Pl. V, figs. 53 & 54. *Zool. Surv. India*.

2008. *Ficus gracilis*: Mahapatra, *Fauna of Krishna Estuary, Estuarine Ecosystem series*, **5**: 128. *Zool. Surv. India*.

Material Examined: 1 shell

Measurement: Length 9 cm

Diagonistic Characters: Shell thin, pear-shaped, drawn out anteriorly into a long, tapered and gracefully curved siphonal canal. Operculum absent.

Distribution: India: Andhra Pradesh, Orissa, Pondicherry, West Bengal; Elsewhere: Persian Gulf, Malagasy, Seychelles, South Japan.

Remarks: Indo-pacific

Place of collection: Gopalpur Beach

Family HARPIDAE
Subfamily HARPINAE
Genus *Harpa* Roeding, 1798

1798. *Harpa* Roeding, *Mus. Bolten.*, p. 149.

10. *Harpa major* (Roeding)

1798. *Harpa major* Roeding, *Mus. Bolten.*, pt. 2: 149.

1822. *Harpa conoidalis* Lamarck, *Hist. Nat. Anim. Sans. Vert.*, 7: 255.

1940. *Harpa conoidalis*: Crichton, *J. Bombay nat. Hist. Soc.*, 42: 330.

1952. *Harpa conoidalis*: Subramanyam, Karandikar and Murti, *J. Univ. Bombay*, 21(3): 52, fig. 151.

1990. *Harpa conoidalis*: Pinn, *Sea Shells of Pondicherry*, Nehru Science Centre, p. 96, fig. 161.

2000. *Harpa major*: Subba Rao and Dey, *Rec. zool. Surv. India Occ. Paper No.*, 187: 136.

2003. *Harpa major*: Subba Rao, *Rec. zool. Surv. India Occ. Paper No.*, 192: 299, pl. 73, figs. 8-9.

2007. *Harpa major*: Ramkrishna, Dey, Barua and Mukhopadhyaya, *Fauna of Andhra Pradesh, State Fauna series*, 5 (7): 115, IX, figs. 103 & 104. *Zool. Surv. India*

Material Examined: 1 shell

Measurement: Length 7.5 cm

Diagonistic Characters: shell ovate, with an inflated body whorl and a small conical spire. Surface glossy, with strong axial ribs. Inner lip covered by a smooth, large callus. Columella without folds. Siphonal canal short and wide. Operculum absent.

Distribution: India: Andhra Pradesh, Pondicherry, Tamil Nadu.

Elsewhere: Indo-Pacific.

Remarks: Indo-pacific

Place of collection: Gopalpur Beach

Subclass HETEROBRANCHIA
Order ALLOGASTROPODA
Superfamily ARCHITECTONICOIDEA
Family ARCHITECTONICIDAE
Genus *Architectonica* (Roeding), 1798

1798. *Architectonica* Roeding, *Mus. Bolten.*, 2: 78

11. *Architectonica laevigata* (Lamarck)

1822. *Architectonica laevigata* Lamarck, *Hist. nat. Anim. Sans. Vert.*, 7: 3.

1942. *Architectonica laevigata*: Gravely, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist)*, 5 (2): 23.

1952. *Architectonica laevigata*: Satyamurti, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist)*, 1 (2): 73, pl. 4, figs. 11a & b.

1952. *Architectonica laevigata*: Subramanyam, Karandikar and Murti, *J. Univ. Bombay*, 21 (3): 32.

1956. *Architectonica laevigata*: Gideon, Menon, Rao and Jose, *J. Bombay nat. Hist. Soc.*, 54 (3): 699.

1961. *Architectonica laevigata*: Menon, Datta Gupta and Das Gupta, *J. Bombay nat. Hist. Soc.*, 58 (2): 482, pl. 4, figs. 32 & 33.

1963. *Architectonica laevigata*: Ray, *Indian Mus. Bull.*, 3 (1&2): 17.

1982. *Architectonica laevigata*: Rajagopal and Mookherjee, *Rec. zool. Surv. India, Occ. Paper No.*, 28: 21.

1990. *Architectonica laevigata*: Pinn, *Sea Shells of Pondicherry*, Nehru Science Centre, p. 16, fig. 19.

1991. *Architectonica laevigata*: Rao, Rao and Maitra, *Fauna of Orissa, State Fauna series*, 1 (3): 40; *Zool. Surv. India*

2000. *Architectonica laevigata*: Subba Rao and Dey, *Rec. zool. Surv. India Occ. Paper No.*, 187: 177.

2003. *Architectonica laevigata*: Subba Rao, *Rec. zool. Surv. India Occ. Paper No.*, 192: 340, pl. 90, fig. 4.

2007. *Architectonica laevigata*: Ramkrishna, Dey, Barua and Mukhopadhyaya, *Fauna of Andhra Pradesh, State Fauna series*, 5 (7): 137, XII, figs. 133 & 134. *Zool. Surv. India*

Material Examined: 1 shell

Measurement: Length 3 cm

Diagonistic Characters: Shell wider than long, with a large, rather flat base. Umbilicus broadly open, within which can be seen the inverted larval shell. A nodular spiral rib bordering the umbilicus. Aperture without a siphonal canal. Operculum corneous, with a tubercle internally. Soft body coloration resulting from a combination of black and white markings in the epidermis and from the internal organ. Coloration showing through most developed on tentacles and the anterior part of the foot.

Distribution: India: Andhra Pradesh, Orissa, Pondicherry, Tamil Nadu, West Bengal; Elsewhere: Persian Gulf, South African coast, Pakistan coast, Iran.

Remarks: Tropical, Warm-temperate

Place of collection: Bahuda estuary

Class BIVALVIA
Subclass PROTOBRANCHIA
Order MYTILOIDA
Superfamily MYTILOIDEA
Family MYTILIDAE
Subfamily MYTILINAE
Genus *Perna* Philipsson, 1788

1788. *Perna* Philipsson, *Diss. Nova. Test. Gen.*, 1788: 20.
Type species: *P. magellanica* Linnaeus = *Mya perna* Linnaeus; subsequent designation, Soot-Ryen, 1955

12. *Perna viridis* (Linnaeus)

1758. *Mytilus viridis* Linnaeus, *Syst. Nat.*, ed 10: 706.
1758. *Mytilus smaragdinus* Chemnitz, *Conch. Cab.*, 8: pl. 83, fig. 745.
1906. *Mytilus smaragdinus*: Comber, *J. Bombay nat. Hist. Soc.*, 17: 214.
1915. *Mytilus smaragdinus*: Preston, *Rec. Indian Mus.*, 11: 297.
1921. *Mytilus viridis*: Hornell, *Madras Fish. Bull.*, 14: 156, fig. 38.
1940. *Mytilus viridis*: Crichton, *J. Bombay nat. Hist. Soc.*, 42: 336.
1956. *Mytilus viridis*: Satyamurti, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist.)*, 1 (2), pt. 7: 42, pl. 5, fig. 1.
1968. *Mytilus viridis*: Cheriyan, *Proc. Symp. Molluscs, Mar. biol. Ass. India*, part 1: 128.
1965. *Mytilus viridis*: Kundu, *J. Bombay nat. Hist. Soc.*, 62 (1): 90, pl. 5, figs. 15a & 15b.
1986. *Perna viridis*: Tikader, Daniel and Subba Rao, *Sea shore animals of Andaman and Nicobar Islands*, Zool. Surv. India, p. 175.
1991. *Perna viridis*: Rao, Rao and Maitra, *Fauna of Orissa, State Fauna series*, 1 (3): 106. Zool. Surv. India.
1992. *Perna viridis*: Subba Rao, Dey and Barua, *Fauna of West Bengal, State Fauna series*, 3 (9): 220, pl. 16, fig. 1. Zool. Surv. India.
1995. *Perna viridis*: Subba Rao, Surya Rao and Manna, *Fauna of Chilka Lake, Wetland Ecosystem series*, 1: 414. Zool. Surv. India.

2000. *Perna viridis*: Subba Rao and Dey, *Rec. zool. Surv. India Occ. Paper No.*, 187: 207.

2007. *Perna viridis*: Dey and Ramkrishna, *Fauna of Andhra Pradesh, State Fauna series*, 5 (7): 181. Zool. Surv. India.

2008. *Perna viridis*: Mahapatra, *Fauna of Krishna Estuary, Estuarine Ecosystem series*, 5: 147. Zool. Surv. India.

Material Examined: 2 valves

Measurement: Length 4.2-7.5 cm

Diagonistic Characters: Shell thick, elongate, triangularly-ovate, inequilateral; umbo terminal; lunule bent inwards forming 1-2 tooth like ridges; sculpture smooth and only with growth lines; ligament thick; anterior adductor scar absent, posterior adductor scar large, cylindrical and located at the posterior half of the shell; greenish or ochre brown.

Distribution: India: Andaman and Nicobar Islands, Andhra Pradesh, Goa, Gujarat, Karnataka, Kerala, Maharashtra, Orissa, Puducherry, Tamil Nadu, West Bengal;

Elsewhere: Red sea, Pakistan coast, Thailand, Indonesia, Philippines, China.

Remark: Indo-pacific, estuarine

Place of collection: Gopalpur beach

Superfamily MACTROIDEA
Family MACTRIDAE
Subfamily MACTRINAE
Genus *Macra* Linnaeus, 1767

1767. *Macra* Linnaeus, *Syst. Nat. ed. 12*: 1125. Type species: *Cardium sultorium* Linnaeus, 1758; subsequent designation Fleming, 1818

Subgenus *Macra* s.st.

13. *Macra grandis* (Gmelin)

1791. *Macra grandis* Gmelin, *Syst. Nat.*, ed., 13: 3259.

1991. *Macra grandis*: Rao, Rao and Maitra, *Fauna of Orissa, State Fauna series*, 1 (3): 125. Zool. Surv. India.

1995. *Macra grandis*: Subba Rao, Surya Rao and Manna, *Fauna of Chilka Lake, Wetland Ecosystem series*, 1: 420. Zool. Surv. India.

Material Examined: 6 valves

Measurement: Length 3.3-3.6 cm

Diagonistic Characters: Shell triangular in shape, equilateral, moderately thick, inflated; umbo small, dorsal margin on either side of umbo gradually sloping, anterior margin broadly rounded, posterior narrower, ventral evenly rounded; surface smooth except for growth lines; hinge narrow, arrangement of teeth similar to that in the preceding species; colour light brown, umbonal region and tip violet; interior smooth, white, with violet blotch near umbonal cavity.

Distribution: India: Orissa;

Elsewhere: African coast, Persian Gulf, Myanmar, Singapore.

Remarks: Intertidal area

Place of Collection: Rushikulya estuary

14. *Maetra symmetrica* (Deshayes)

1853. *Maetra symmetrica* Deshayes, *Proc. zool. Soc. London*, 1853: 17.

1991. *Maetra symmetrica*: Rao, Rao and Maitra, *Fauna of Orissa, State Fauna series, 1(3)*: 127. Zool. Surv. India.

2008. *Maetra symmetrica*: Mahapatra, *Fauna of Krishna Estuary, Estuarine Ecosystem series, 5*: 153. Zool. Surv. India.

Material Examined: 2 valves

Measurement: Length 3.1–4.8 cm

Diagonistic Characters: Shell triangular in shape, equilateral, moderately thick, inflated; umbo small, dorsal margin on either side of umbo gradually sloping, anterior margin broadly rounded, posterior narrower, absent of concentric grooves on its anterior part and violet in colouration.

Distribution: India: Andhra Pradesh, Orissa;

Elsewhere: Red sea, Sri Lanka, Myanmar.

Remarks: Marine, Sandy soft bottom

Place of collection: Rushikulya estuary

Genus *Siliqua* Megerle, 1811

1811. *Siliqua* Megerle, *Mag. Ges. Nat. Fr. Berlin*, 5: 44.
Type species: *Solen radiata* Linnaeus, 1758

15. *Siliqua radiata* (Linnaeus)

1758. *Solen radiata* Linnaeus, *Syst. Nat.*, ed., 10: 1114.

1898. *Siliqua radiata*: Melvill and Sykes, *Proc. malac. Soc. London*, 3: 229.

1956. *Siliqua radiata*: Satyamurti, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist)*, 1 (2), pt. 7: 157, pl.14, figs.1a and 1b.

1986. *Siliqua radiata*: Tikader, Daniel and Subba Rao, *Sea shore animals of Andaman and Nicobar Islands*, Zool. Surv. India, p.177.

1991. *Siliqua radiata*: Rao, Rao and Maitra, *Fauna of Orissa, State Fauna series, 1(3)*: 132. Zool. Surv. India.

1992. *Siliqua radiata*: Subba Rao, Dey and Barua, *Fauna of West Bengal, State Fauna series, 3(9)*: 232, pl.21, figs, 8 & 9. Zool. Surv. India.

1995. *Siliqua radiata*: Subba Rao, Surya Rao and Manna, *Fauna of Chilka Lake, Wetland Ecosystem series, 1*: 422. Zool. Surv. India.

2000. *Siliqua radiata*: Subba Rao and Dey, *Rec. zool. Surv. India Occ. Paper No.*, 187: 252.

2007. *Siliqua radiata*: Dey and Ramkrishna, *Fauna of Andhra Pradesh, State Fauna series, 5(7)*: 214. Zool. Surv. India.

2008. *Siliqua radiata*: Mahapatra, *Fauna of Krishna Estuary, Estuarine Ecosystem series, 5*: 158. Zool. Surv. India.

Material Examined: 1 and half valve

Measurement: Length 7.7 cm

Diagonistic Characters: Shell thin, elongately compressed, elliptical, gaping at both the ends; umbo anterior, beaks slightly in front of midline; anterior side short, excavated near umbone; posterior elongated; dorsal margin almost straight; ventral margin convex, arched, sloping upwards towards the end of both sides; internal ribs almost straight; brown to lilac with four white radial rays.

Distribution: India: Andaman and Nicobar Islands, Andhra Pradesh, Goa, Gujarat, Kerala, Maharashtra, Orissa, Tamil Nadu, West Bengal; Elsewhere: South African coast, Sri Lanka, Myanmar, Indonesia, Philippines.

Remarks: Estuarine

Place of collection: Bahuda estuary

Superfamily VENEROIDEA

Family VENERIDAE

Subfamily VENERINAE

Subfamily SUNETTINAE

Genus *Sunetta* Link, 1807

1807. *Sunetta* Link, *Beschr. Nat. Samml. Uni. Rostock*, (3): 148. Type species: *Donax scripta* Linnaeus; subsequent designation, Dall, 1902.

16. *Sunetta meroe* (Linnaeus)

1758. *Venus meroe* Linnaeus, *Syst. Nat.*, **10**: 687.

1914. *Meroe chilkaensis* Preston, *Rec. Indian Mus.*, **10**: 304, figs 13-13a. Type locality: Satpara, Chilka lake, Orissa.

1991. *Sunetta meroe*: Rao, Rao and Maitra, *Fauna of Orissa, State Fauna series*, **1**(3): 147. Zool. Surv. India.

1995. *Sunetta meroe*: Subba Rao, Surya Rao and Manna, *Fauna of Chilka Lake, Wetland Ecosystem series*, **1**: 428. Zool. Surv. India.

2007. *Sunetta meroe*: Dey and Ramkrishna, *Fauna of Andhra Pradesh, State Fauna series*, **5** (7): 236. Zool. Surv. India.

Material Examined: 9 valves

Measurement: Length 1.8-4.7 cm

Diagonistic Characters: Shell subovate, anterior end rounded, posterior subtruncate; umbo posterior; beak slightly in front of mid line; sculpture with prominent concentric ridges; more prominent in the middle; escutcheon deeply excavated; beige to lilac; with dark brown or yellowish brown zig-zag lines throughout the body; inner ventral margin crenulated.

Distribution: India: Andhra Pradesh, Maharashtra, Orissa, Puducherry, Tamil Nadu;

Elsewhere: Indian Ocean.

Remarks: Indo-pacific, estuarine

Place of Collection: Rushikulya estuary

17. *Sunetta scripta* (Linnaeus)

1758. *Donax scripta* Linnaeus, *Syst. Nat.*, **10**: 683.

1914. *Meroe satparaensis* Preston, *Rec. Indian Mus.*, **10**: 305-306, figs 12-12a. Type locality: Satpara, Chilka lake, Orissa; types: NZC, ZSI.

1940. *Sunetta scripta*: Crichton, *J. Bombay nat. Hist. Soc.*, **42**: 325.

1941. *Sunetta scripta*: Gravely, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist)*, **5** (1): 50.

1956. *Sunetta scripta*: Satyamurti, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist)*, **1** (2), pt.7 : 115, pl.17, figs.1a and 1b.

1965. *Sunetta scripta*: Kundu, *J. Bombay nat. Hist. Soc.*, **62** (2): 214, pl.19, figs. 61a & 61b.

1991. *Sunetta scripta*: Rao, Rao and Maitra, *Fauna of Orissa, State Fauna series*, **1**(3): 146. Zool. Surv. India.

1995. *Sunetta scripta*: Subba Rao, Surya Rao and Manna, *Fauna of Chilka Lake, Wetland Ecosystem series*, **1**: 428. Zool. Surv. India.

2000. *Sunetta scripta*: Subba Rao and Dey, *Rec. zool. Surv. India Occ. Paper No.*, **187**: 275.

2007. *Sunetta scripta*: Dey and Ramkrishna, *Fauna of Andhra Pradesh, State Fauna series*, **5** (7): 237. Zool. Surv. India.

Material Examined: 5 valves

Measurement: Length 1.9-3.8 cm

Diagonistic Characters: Shell wedge shaped; umbo posterior, beak slightly in front of midlines; anterior end rounded, posterior truncate; sculpture at smooth only growth lines; escutcheon deeply excavated; variable in colour pattern, white or beige, lilac with brown violet zig-zag lines or with deep violet patches; inner ventral margin crenulated.

Distribution: India: Andhra Pradesh, Goa, Gujarat, Karnataka, Kerala, Orissa, Tamil Nadu; Elsewhere: Sri Lanka, Indonesia, Myanmar, Philippines.

Remarks: Indo-pacific, estuarine

Place of collection: Rushikulya estuary

Subfamily MERETRICINAE

Genus *Meretrix* Lamarck, 1799

1799. *Meretrix* Lamarck, *Mem. Soc. Hist. nat. Paris*, p. 85. Type species: *Venus meretrix* Linnaeus, 1758

18. *Meretrix casta* (Gmelin)

1791. *Venus casta* Gmelin, *Syst. Nat.*, **13**: 3278.

1915. *Meretrix casta*: Preston, *Rec. Indian Mus.*, **11**: 300.

1915. *Meretrix ovum*: Preston, *Rec. Indian Mus.*, **11**: 300.

1916. *Meretrix casta*: Preston, *Rec. Indian Mus.*, **12**: 35.

1916. *Meretrix ovum*: Preston, *Rec. Indian Mus.*, **12**: 35.

1916. *Meretrix ovum*: Annandale and Kemp, *Mem. Indian Mus.*, **5** (4): 351.

1917. *Meretrix casta*: Hornell, *Rec. Indian Mus.*, **13**: 166, pl. 5, figs. 30-33.

1941. *Meretrix casta*: Gravely, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist)*, **5** (1): 50.

1941. *Meretrix ovum*: Gravely, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist)*, 5 (1): 50.
1956. *Meretrix casta*: Satyamurti, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist)*, 1 (2), pt. 7: 111, pl.16, figs. 2a & 2b.
1965. *Meretrix casta*: Kundu, *J. Bombay nat. Hist. Soc.*, 62 (1): 103, pl.15, figs. 52a & 52b.
1968. *Meretrix casta*: Cheriyan, *Proc. Symp. Molluscs, Mar. biol. Ass. India*, part 1: 130.
1968. *Meretrix ovum*: Cheriyan, *Proc. Symp. Molluscs, Mar. biol. Ass. India*, part 1: 130.
1975. *Meretrix casta*: Durve, *Rec. zool. Surv. India*, 68: 423.
1991. *Meretrix casta*: Rao, Rao and Maitra, *Fauna of Orissa, State Fauna series*, 1 (3): 148. *Zool. Surv. India*.
1995. *Meretrix casta*: Subba Rao, Surya Rao and Manna, *Fauna of Chilka Lake, Wetland Ecosystem series*, 1: 428. *Zool. Surv. India*.
2000. *Meretrix casta*: Subba Rao and Dey, *Rec. zool. Surv. India Occ. Paper No.*, 187: 276.
2001. *Meretrix casta*: Mahapatra, *Fauna of Godavari Estuary, Estuarine Ecosystem series*, 4: 78. *Zool. Surv. India*.
2007. *Meretrix casta*: Dey and Ramkrishna, *Fauna of Andhra Pradesh, State Fauna series*, 5 (7): 240. *Zool. Surv. India*.
2008. *Meretrix casta*: Mahapatra, *Fauna of Krishna Estuary, Estuarine Ecosystem series*, 5: 163. *Zool. Surv. India*.

Material Examined: 10 valves

Measurement: Length 3.9-4 cm

Diagonistic Characters: Shell medium, solid, but less heavy than *M. meretrix*; umbo slightly anterior, beak more attenuated; lunule well developed and about two-third or more of anterior dorsal margin; variable in shape and colour; anterior cardinal teeth more strong on left valve; pallial line well impressed, pallial sinus absent.

Distribution: India: Andaman and Nicobar Islands, Andhra Pradesh, Gujarat, Karnataka, Kerala, Orissa, Puducherry, Tamil Nadu;

Elsewhere: Indo-Pacific.

Remarks: Estuarine, common

Place of collection: Rushikulya estuary and Bahuda estuary

19. *Meretrix meretrix* (Linnaeus)

1758. *Venus meretrix* Linnaeus, *Syst. Nat.*, 10: 686.
1906. *Meretrix morphina*: Comber, *J. Bombay nat Hist. Soc.*, 17: 215.
1915. *Meretrix morphina*: Preston, *Rec. Indian Mus.*, 11: 300.
1917. *Meretrix meretrix* var. *aurora* Hornell, *Rec. Indian Mus.*, 13: 162, pl. 4, figs.9-11. Type locality: Tellicherry, Kerala; types: NZC, ZSI.
1917. *Meretrix meretrix* var. *impudica*: Hornell, *Rec. Indian Mus.*, 13: 160, pl. 5, figs.14-18, pl.7, figs 39, 40.
1917. *Meretrix meretrix* var. *castenea*: Hornell, *Rec. Indian Mus.*, 13: 161, pl. 4, fig.12.
1917. *Meretrix meretrix* var. *zonaria*: Hornell, *Rec. Indian Mus.*, 13: 162.
1917. *Meretrix meretrix* var. *morphina* : Hornell, *Rec. Indian Mus.*, 13: 163, pl. 4, figs.5-8.
1965. *Meretrix meretrix*: Kundu, *J. Bombay nat. Hist. Soc.*, 62 (1): 102, pl.15, figs. 51a & 51b.
1975. *Meretrix meretrix*: Durve, *Rec. zool. Surv. India*, 68: 423.
1986. *Meretrix meretrix*: Tikader, Daniel and Subba Rao, *Sea shore animals of Andaman and Nicobar Islands*, *Zool. Surv. India*, p.178.
1991. *Meretrix meretrix*: Rao, Rao and Maitra, *Fauna of Orissa, State Fauna series*, 1 (3): 148. *Zool. Surv. India*.
1992. *Meretrix meretrix*: Subba Rao, Dey and Barua, *Fauna of West Bengal, State Fauna series*, 3 (9): 242, pl.25, figs 1 & 2. *Zool. Surv. India*.
1995. *Meretrix meretrix*: Subba Rao, Surya Rao and Manna, *Fauna of Chilka Lake, Wetland Ecosystem series*, 1: 428. *Zool. Surv. India*.
2000. *Meretrix meretrix*: Subba Rao and Dey, *Rec. zool. Surv. India Occ. Paper No.*, 187: 276.
2001. *Meretrix meretrix*: Mahapatra, *Fauna of Godavari Estuary, Estuarine Ecosystem series*, 4: 78. *Zool. Surv. India*.
2006. *Meretrix meretrix*: Dey, *Handbook on Mangrove associate Molluscs of Sundarbans*, *Zool. Surv. India Kolkata*, p.76.
2007. *Meretrix meretrix*: Dey and Ramkrishna, *Fauna of Andhra Pradesh, State Fauna series*, 5 (7): 241. *Zool. Surv. India*.
2008. *Meretrix meretrix*: Mahapatra, *Fauna of Krishna Estuary, Estuarine Ecosystem series*, 5: 164. *Zool. Surv. India*.

Material Examined: 4 valves

Measurement: Length 2.2-4.6 cm

Diagonistic Characters: Shell moderately large, heavy, ventricose, compressed, hinge narrow; umbo almost central, beak attenuated; lunule heart shaped and almost half of anterior dorsal margin; sculpture smooth only growth lines; anterior cardinal teeth more strong on left valve; muscle scars well impressed, anterior adductor smaller, semilunar, posterior adductor scar large with narrow anterior end; pallial line slightly arched posteriorly; variable in colour.

Distribution: India: Andaman and Nicobar Islands, Andhra Pradesh, Goa, Gujarat, Karnataka, Kerala, Orissa, Puducherry, Tamil Nadu.

Elsewhere: Widely distributed in Indo-Pacific.

Remarks: Indo-pacific, common

Place of collection: Bahuda estuary

Genus *Marcia* H. and A. Adams, 1857

1857. *Marcia* H. and A. Adams, *Gen. Rec. Moll.*, 2: 423.

Type species: *Venus pinguis* Chemnitz = *Venus opima* Gmelin; subsequent designation, Kobelt, 1881

20. *Marcia pinguis* (Schroeter)

1788. *Venus pinguis* Schroeter, *Nomen. Register*, 10: 112.

1906. *Venus (Chione) pinguis* : Comber, *J. Bombay nat Hist. Soc.*, 17: 215.

1915. *Tapes pinguis*: Preston, *Rec Indian Mus.*, 11: 300.

1915. *Tapes ceylonensis* : Preston, *Rec Indian Mus.*, 11: 301.

1948. *Katelsia opima*: Ray, *Rec Indian Mus.*, 46: 118.

1941. *Catelsia opima*: Gravely, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist)*, 5 (1): 52.

1956. *Catelsia opima*: Satyamurti, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist)*, 1 (2), pt. 7: 128, pl.19, figs. 6a-c.

1968. *Catelsia opima*: Cheriyan, *Proc. Symp. Molluscs, Mar. biol. Ass. India*, part 1: 131.

1975. *Katelsia opima*: Durve, *Rec. zool. Surv. India*, 68: 423.

1991. *Marcia pinguis*: Rao and Rao, *Fauna of Lakshadweep, State Fauna series*, 2: 357. *Zool. Surv. India*.

1991. *Marcia pinguis*: Rao, Rao and Maitra, *Fauna of Orissa, State Fauna series*, 1 (3): 152; *Zool. Surv. India*.

1995. *Marcia pinguis*: Subba Rao, Surya Rao and Manna, *Fauna of Chilka Lake, Wetland Ecosystem series*, 1: 429. *Zool. Surv. India*.

2000. *Marcia pinguis*: Subba Rao and Dey, *Rec. zool. Surv. India Occ. Paper No.*, 187: 282.

2001. *Marcia pinguis*: Mahapatra, *Fauna of Godavari Estuary, Estuarine Ecosystem series*, 4: 79. *Zool. Surv. India*.

2007. *Marcia pinguis*: Dey and Ramkrishna, *Fauna of Andhra Pradesh, State Fauna series*, 5 (7): 243. *Zool. Surv. India*.

2008. *Marcia pinguis*: Mahapatra, *Fauna of Krishna Estuary, Estuarine Ecosystem series*, 5: 165. *Zool. Surv. India*.

Material Examined: 2 valves

Measurement: Length 3.5-4.8 cm

Diagonistic Characters: Shell medium, subovate, anterior rounded, posterior becoming subtruncate; umbo anterior, beak more attenuated; lunule well defined, depressed and cordate; sculpture smooth with growth lines only; adductor muscles scars almost equal; pallial line deep, pallial sinus well developed and more than half of the shell; beige with brown, grey umbonal region.

Distribution: India: Andaman and Nicobar Islands, Andhra Pradesh, Gujarat, Kerala, Lakshadweep, Orissa, Tamil Nadu;

Elsewhere: Indo-Pacific.

Remarks: Indo-Pacific

Place of collection: Rushikulya estuary

21. *Marcia recens* (Dillwyn)

1795. *Venus recens* Chemnitz, *Syst. Conch. Cab.* 11: 229, fig. 1979. Type locality Indian coasts of Coromandel.

1991. *Marcia (Marcia) recens*: Rao, Rao and Maitra, *Fauna of Orissa, State Fauna series*, 1(3): 152. *Zool. Surv. India*.

Material Examined: 2 shells

Measurement: Length 2.3-3.2 cm

Diagonistic Characters: The shell surface is more or less concentrically grooved and gives a varnished look. The tip of the umbo is some times pink or blue.

Distribution: India: Maharashtra, Orissa, Tamil Nadu;

Elsewhere: Indo-Pacific.

Remarks: Indo-Pacific, estuarine

Place of collection: Rushikulya estuary

Genus *Paphia* Roeding, 1758

1798. *Paphia* Roeding, *Mus. Bolten.*, p. 175. Type species: *Paphia alapapilionis* = *Venusrotundata* Linnaeus; subsequent designation, Dall, 1902 Subgenus *Paphia* s.st

22. *Paphia alapapiliones* Roeding

1798. *Paphia alapapiliones* Roeding, *Mus. Bolten.*, 1798: 175.
1940. *Paphia alapapiliones*: Crichton, *J. Bombay nat. Hist. Soc.*, 42: 331.
1941. *Paphia alapapiliones*: Gravely, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist)*, 5 (1): 52.
1956. *Paphia alapapiliones*: Satyamurti, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist)*, 1(2), pt. 7: 130, pl.20, fig.2.
1965. *Paphia alapapiliones*: Kundu, *J. Bombay nat. Hist. Soc.*, 62(2): 212, pl.16, figs. 55a & 55b.
2000. *Paphia alapapiliones*: Subba Rao and Dey, *Rec. zool. Surv. India Occ. Paper No.*, 187: 282.

Material Examined: 2 valves

Measurement: Length 4.6 cm

Diagonistic Characters: Shell elongately-ovate, arched, much longer than high; umbo anterior; beak well in front of midline; lunule developed; sculpture with concentric ridges, fine on umbonal region and gradually coarse and more on the posterior slope; colour orange brown with four brown blotches arranged in longitudinal fashion.

Distribution: India: Andaman Islands, Gujarat, Tamil Nadu.

Elsewhere: Indian Ocean.

Remarks: Indian Ocean, estuarine

Place of collection: Rushikulya estuary, Gopalpur beach

23. *Paphia malabarica* (Schroeter)

1788. *Venus malabarica* Schroeter, *Namen. Register.*, p. 112, pl.6, figs 4, 4a, 4b.

1898. *Tapes malabarica*: Melville and Skyes, *Proc. malac. Soc. London*, 3: 47.

1906. *Tapes (Pullastra) malabarica*: Comber, *J. Bombay nat. Hist. Soc.*, 17: 215.

1940. *Paphia malabarica*: Crichton, *J. Bombay nat. Hist. Soc.*, 42: 331.

1941. *Paphia malabarica*: Gravely, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist)*, 5 (1): 52.

1956. *Paphia malabarica*: Gideon, Menon, Rao and Jose, *J. Bombay nat. Hist. Soc.*, 54 (3): 703.

1956. *Paphia malabarica*: Satyamurti, *Bull. Madras Govt. Mus. New Ser. (Nat. Hist)*, 1 (2), pt.7:130, pl.20, figs.3a and 3b.

1965. *Paphia malabarica*: Kundu, *J. Bombay nat. Hist. Soc.*, 62 (2): 211, pl.16, figs. 54a & 54b.

1968. *Paphia malabarica*: Cheriyan, *Proc. Symp. Molluscs, Mar. biol. Ass. India*, part 1: 131.

1986. *Paphia malabarica*: Tikader, Daniel and Subba Rao, *Sea shore animals of Andaman and Nicobar Islands*, Zool. Surv. India, p.178.

1991. *Paphia malabarica*: Rao, Rao and Maitra, *Fauna of Orissa, State Fauna series*, 1 (3): 153. Zool. Surv. India.

1992. *Paphia malabarica*: Subba Rao, Dey and Barua, *Fauna of West Bengal, State Fauna series*, 3 (9): 245, pl. 26, fig. 1. Zool. Surv. India.

2000. *Paphia malabarica*: Subba Rao and Dey, *Rec. zool. Surv. India Occ. Paper No.*, 187: 282.

2001. *Paphia malabarica*: Mahapatra, *Fauna of Godavari Estuary, Estuarine Ecosystem series*, 4: 79. Zool. Surv. India.

2007. *Paphia malabarica*: Dey and Ramkrishna, *Fauna of Andhra Pradesh, State Fauna series*, 5 (7): 246. Zool. Surv. India.

Material Examined: 2 shells

Measurement: Length 5.2 cm

Diagonistic Characters: Shell cordately-ovate, arched, much longer than high; umbo anterior; beak well in front of midline; lunule developed and two third of the length of anterior dorsal margin; sculpture with concentric ridges, fine on umbonal region and gradually coarse and more on the posterior slope; beige to orange brown; adductor muscle scars almost equal; pallial sinuis developed towards the umbo and occupy more than half of the width of shell.

Distribution: India: Andaman and Nicobar Islands, Andhra Pradesh, Gujarat, Kerala, Maharashtra, Orissa, Tamil Nadu.

Elsewhere: Persian Gulf, Gulf of Aden, Pakistan, Sri Lanka, Myanmar, Malaysia, Indonesia, Philippines, China.

Remarks: Indian Ocean, estuarine

Place of collection: Rushikulya estuary

Order ARCOIDA
Super family ARCOIDEA
Suborder PINNINA
Superfamily PINNOIDEA
Order VENEROIDA
Superfamily CARDITOIDEA
Superfamily MACTROIDEA
Superfamily VENEROIDEA
Class BIVALVIA
Subclass PROTOBRANCHIA
Subfamily ANADARINAE
Genus *Anadara* Gray, 1847

1847. *Anadara* Gray, *Proc. zool. Soc. London*, **15**: 198, 206.
Type species: *Arca antiquata* Linnaeus, 1758

24. *Anadara antiquata* (Linnaeus)

1758. *Arca antiquata* Linnaeus, *Syst. Nat.* ed **10**: 1114.

2007. *Anadara antiquata*: Dey and Ramkrishna, *Fauna of Andhra Pradesh, State Fauna series*, **5** (7): 172. *Zool. Surv. India*.

Material Examined: 2 bivalves

Measurement: Length 5.9 cm

Diagonistic Characters: Shell inequivalve, solid, inequilateral, obliquely ovate and elongate in outline, with an extended posteroventral part. Umbones much inflated, situated rather forwards, cardinal area narrow and elongate. About 40 radial ribs (35 to 44) at each valve; ribs usually with a narrow median groove on top, most visible towards the anterior ventral margin of valves in mature specimens. Periostracum coarse and velvety, often eroded on umbones. Internal margins with strong crenulations corresponding with the external radial ribs. No byssal gape. Colour: outside of shell greyish white, often stained darker grey on umbonal and posterior areas; periostracum dark brown. Inner side white, sometimes light yellow in the umbonal cavity.

Distribution: India: Andaman and Nicobar Islands, Andhra Pradesh, Goa, Gujarat, Kerala, Maharashtra, Orissa, Tamil Nadu; Elsewhere: Sri Lanka, Myanmar, Indonesia, Philippines.

Remarks: Inertidal, estuarine

Place of collection: Bahuda estuary

Superfamily CARDITOIDEA
Family CARDITIDAE
Subfamily CARDITESTINAE
Genus *Cardites* Link, 1807

1807. *Cardites* Link, *Beschr. Nat. Samml. Univ. Rostock*, **(3)**: 153. Type species: *Chama antiquata* Linnaeus, 1758

25. *Cardites bicolor* (Lamarck)

1819. *Cardita bicolor* Lamarck, *Hist. nat. Anim. Sans. Vert.*, **6**: 427.

2007. *Cardita bicolor*: Dey and Ramkrishna, *Fauna of Andhra Pradesh, State Fauna series*, **5** (7): 199. *Zool. Surv. India*.

Material Examined: 1 valve

Measurement: Length 1.9 cm

Diagonistic Characters: Shell equivalve, often stout and inflated, trigonal ovate to trapezoidal in outline, inequilateral. Umbones generally anterior, prosogyrate, and prominent. Lunule short and deep. Exterior mostly with strong radial ribs. Ligament external, attached behind umbones on well-marked nymphs. Hinge plate strong, usually with 2 cardinal teeth, unequal and often with fine transverse striations; lateral teeth frequently more or less reduced to absent. Two adductor muscle scars slightly inequal.

Distribution: India: Andhra Pradesh, Goa, Gujarat, Puducherry, Tamil Nadu; Elsewhere: Sri Lanka, Myanmar.

Remarks: Indo-pacific

Place of collection: Rushikulya estuary

DISCUSSION AND CONCLUSION

During the present study, a total of 11 examples of gastropods and 14 examples of bivalves consisting of 20 genera and 25 species were identified. Most of the molluscs were marine forms except for one (*Bellamya bengalensis*) whose occurrence is of accidental in nature and not a

common species in the coastal area of south Odisha. However, further investigations is necessary which may reveal new species and new records from the coast.

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Theodoxus oualaniensis



Cerethium scabridum



Bursa rana



Murex carbonneiri



Bullia vittata



Oliva oliva



Olivancillaria gibbosa



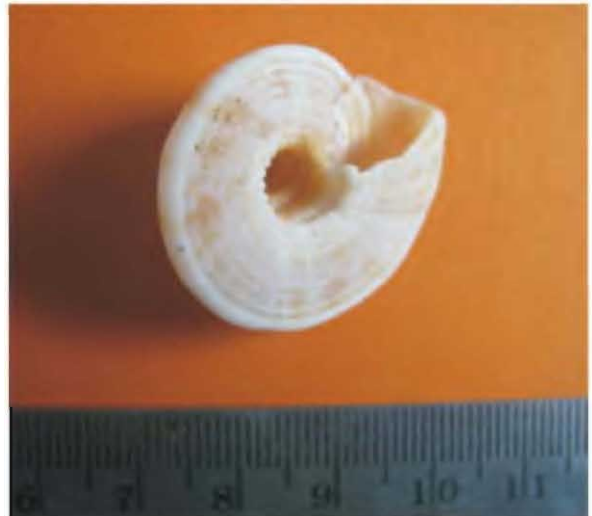
Polinices didyma



Ficus gracilis



Harpa major



Architectonick laevigata



Perna viridis



Mactra grandis



Mactra symmetrica



Sunetta meroe



Sunetta scripta



Meretrix casta



Meretrix meretrix



Marcia pinguis



Marcia recens



Paphia alapapilio



Paphia malabarica



Anadara antiquata



Cardites bicolor